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those of the crust, and that the great density of the earth (5.6) is due to "compression by pressure," in spite of the remarkable incompressibility of even water, with the interior heat acting contrariwise. The most commonly accepted view of the great weight of the nucleus of the earth is that it is composed of heavy metallic substances; for instance, astronomer Ball regards meteorites as the remains of disrupted planets such as would be liberated by the explosion of the earth.

Concerning the relationship between the anomalies of gravity and earth movements, Dr. Gilbert says:

Spencer emphasizes the fact that there are large plus anomalies within the region once covered by the Laurentian ice and regards it as proof that the rising of the region after the removal of the ice load was not caused by the removal of the load.

Again he says:

The fact (of plus anomalies within this area) may equally be used to discredit the hypothesis underlying his mode of interpreting anomalies.

These statements give neither the facts nor arguments upon which Spencer bases his hypothesis that the anomalies are not due to the removal of an ice load, nor how the facts discredit his hypothesis. Observing that the plus anomaly (equaling 700 feet of rock) north of the Adirondacks, and the deformation (of 650 feet) of the earth's crust as seen in the tilted beaches, closely agree, Spencer naturally concluded that there is a direct relationship between the two phenomena. Farther south in the Adirondacks, composed of dense rocks, the anomaly of gravity is reduced to 200 feet of rock. Southward from this and extending over a very great region once covered by ice the anomalies show deficiency of weight. If the deformation adjacent to the St. Lawrence River were due to the removal of the ice sheet, then the region to the south should also have been elevated to isostate equilibrium.

Supporting Spencer's conclusions, from evidence lying outside of the glaciated region, the Appalachian belt and Florida are overweighted, although much material has been removed from the mountains. On the other hand, the coastal region is found to be under-

loaded, although it is here that the deposition of the materials, brought down from the mountains, have accumulated. This unloading agrees with the subsidence shown by the canyons and valleys indenting the submarine border of the continent. Yet this collateral evidence is not considered by Gilbert.

The observation of all these features is of comparatively recent date, yet they have the greatest value, although they are contrary to the hypothesis that the mobility of the earth's crust is so complete that areas of considerable size can not either be loaded or unloaded, without being fully accounted for in the isostatic balance. The phenomena of earth movements and of anomalies of gravity introduces new features in the evolution of our continents, which have only begun to be investigated.

It may be added that Professor Leverett and also Mr. Taylor have just announced that they have found moraines in the lake region, in disagreement with the hypothesis that the deformation of the earth's crust is due to the removal of the ice—results in accord with relationship of the anomalies of gravity and earth movements as lately first described by the present writer.

J. W. SPENCER

#### HEADS OF DEPARTMENTS: A COMMENTARY UPON DR. JOHNSTON'S ARTICLE

It was very wholesome reading that Doctor Johnston offered the heads of departments in his article upon University Organization, appearing in the December 26 issue of *SCIENCE*, p. 908. The unfortunate conditions described so truly he evidently finds existing not in any one special institution, but in many.

Any fair-minded head realizes the disadvantages under which younger members of his staff labor. Unfortunately, there are many professors who are quite content to allow their associates to remain unheard and unheeded, either because they honestly (and ignorantly) believe them lacking in wisdom or because they fear the effect of allowing them to be in the least prominent. For such, as well as for the more liberally inclined,

Doctor Johnston's frank utterances are of benefit and form an integral part of many present-day expressions which, no doubt, will result in bettering conditions in universities.

Some readers of the article referred to might perhaps have desired more detailed expression in the author's constructive paragraphs. He fails, in the estimation of the undersigned, to give in sufficient detail, suggestions for the relief of the situation in general existing between a head of department and his staff, although it is this feature which he particularly criticizes in the article referred to. In just what position, for example, should a head regard his men, with reference to their responsibilities? In how far would the Doctor make them independent of the head, that is, free to act upon their own initiative, without first obtaining the sanction of the chief, etc.?

A detail included in Doctor Johnston's broad generalizations and annually clamoring for relief is as follows: A head, in recommending a member of his staff for advancement, either in rank or salary, is almost invariably and perhaps sometimes unconsciously influenced by prejudice. The man of pleasing personality or with a possible close social connection or representing a particular phase of the work in which the head is interested is the one recommended for promotion, although others on the staff are perhaps more useful to the institution and more deserving than the party fortunate enough, for reasons above stated, to be close to the chief. What measures of relief for this condition would Doctor Johnston advise?

We know of one department where the staff, rebelling at the recommendation made by their head, drew up and submitted to their president counter resolutions recommending a fellow member other than the one favored by their chief. But for the president to give heed to such mutinous (?) expressions, when, as the Doctor shows, he is dependent upon the various heads, would be destructive to all system and discipline.

The author intimates that men of a department should be at liberty to discuss matters of their division or department freely with

the dean of a college or even carry their criticisms and complaints to higher officials. Arguing by analogy, we must assume that he would have the heads do the same—namely go around their dean and lay their woes before a president or even, disregarding the latter official, go directly to the board of regents. We hardly believe that such a system or, rather, lack of system, was in the author's mind at the time he wrote the lines referred to. If so, on the principle of "What is sauce for the goose, etc.," it would appear only right that, if the dean of a college should consult the members of a department, disregarding the head, he should expect an equal disregard of professional etiquette on the part of a head.

We doubt also whether Doctor Johnston, when he states, referring to "the results of arbitrary power placed in the hands of single men without check or publicity" that "such a system always breeds dishonesty and crime," really refers to conditions in any *university*; if such is the case, he uses somewhat strong language. One might, at this point, be a bit facetious, and we are tempted to ask the Doctor what, in his opinion, the result would be if this arbitrary power were placed in the hands of married men?

Without, in any way, taking issue with the excellent article referred to, it suggests certain phases of the problem which Doctor Johnston did not discuss and which we mention here at the risk of being regarded presuming—believing that the subject is one which merits free expression from all standpoints.

This thought occurs to the writer. The head of a department is generally several years the senior of his men and with that seniority *should* go a maturity of judgment born of an experience generally lacking in the younger men. Further, allowing that all the undesirable traits listed by Doctor Johnston may exist in a head, are we not liable to find just as many or more undesirable characteristics in the numerous young minds under him with the additional factor that the younger minds of the staff have not reached that point in development where they can see the futility of such characteristics?

Again (and here is a weakness in some heads, fortunately of rare occurrence, which Doctor Johnston fails to take cognizance of), we sometimes see the head of a department seeking to climb into favor with a dean, president or board of trustees at the expense of another department or other departments, by depreciating the work of others, by ridiculing or criticizing suggestions not emanating from his own department, by intimations and even fabrications regarding the efficiency of an associated department, etc. Fortunately, this characteristic on the part of a head is rare, although the fact that it does exist in institutions is apparent to almost any worker who has been connected with universities for twenty years or more.

Now, then, admitting that this weakness exists in some heads and realizing that characteristics of this kind are found more or less in many men, must we not admit the possibility of the same existing in the minds and characters of one, two or several of the men under a head? Do we not see young men in the profession, desiring prominence and advancement in a department, impatient, selfishly critical of their chief, undermining his position when possible, with the hope of personal advancement and so jealous of their associates of equal rank as to resort to ridicule or fabrication at their expense, if it appears to them necessary for their personal ambition? This view, of course, is an extreme one—purposely so—that we may in taking to heart Doctor Johnston's excellent remarks, not fail to see the other side of the question.

We know young men to-day—men of pronounced mentality—hypercritical of their chief and insistent upon the merits of their own views of administration—views which they might radically change after attaining maturity of experience. Some of these young men are of such self-satisfied temperament that, in years to come, if they attain positions of authority to which they aspire, they will be more dictatorial in their departments and more hide-bound in their views than the chiefs whose views they now seek to belittle.

Perhaps enough has been said to indicate to us, using, in part, a time-worn phrase, that there may be a middle course and that, in swinging from the rocks on one side of the strait, care should be taken to prevent collision with the opposite shore.

The efficiency of a department is, of course, the standard by which it is judged in the up-building of a university. What better basis is there than its ability to give graduate work? We know of an institution fortunate in the possession of a dean of its graduate school who, with remarkable ability in this particular line, has, by many means, not necessarily through the heads, acquainted himself with the powers in this direction, exhibited by the various departments in his institution. His records are, therefore, an index of the comparative merits and demerits of different departments and will doubtless be used for reference when occasion demands. Does this not show a tendency to get away from the autocracy of the present system?

In the writer's own department, a most happy condition, recently inaugurated, prevails. The leading members of the staff are section heads, each with his own particular line of work, his own experimental projects, his own employees, his own budget. The responsibility of expenditures and results rests directly upon the section head and he is judged accordingly. The chief of the department has a general oversight over the work of his staff and is in charge of the executive work of the division. Regular meetings of the staff, with the chief of the division as chairman, are held for the purpose of transacting business pertinent to the division, such as the approval of projects or of publications, by vote; plans for the betterment of work, courses given in college, etc., etc., and it has been found that fostering a cooperative spirit upon the part of the men and emphasizing their individual responsibility gives far better results than the opposite policy—one which is still followed (sad to relate) by department heads who have not yet "seen the light." F. L. WASHBURN  
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